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Claims

1. A method of forming a gold layer having biaxial texturing on a substrate, the method comprising electrodepositing gold onto a surface of the substrate at a current density of less than about 5.0 mA/cm² for at least about 1 minute.
2. The method of claim 1 including electrodepositing the gold at a current density of between about 0.10 and 3.5 mA/cm² for between about 1 and 60 minutes.
3. The method of claim 1 including electrodepositing the gold at a current density of between about 0.13 and 0.30 mA/cm² for between about 30 and 60 minutes.
4. The method of claim 1 including electrodepositing the gold at a current density of about 0.13 mA/cm² for between about 45 and 60 minutes.
5. The method of claim 1 including annealing the gold layer to increase the biaxial texturing in the gold layer.
6. The method of claim 5 including annealing the gold layer in forming gas at between about 500 and 600°C for between about 12 and 60 hours to increase the biaxial texturing in the gold layer.
7. The method of claim 5 including annealing the gold layer at about 550 °C for about 48 hours to increase the biaxial texturing in the gold layer.
8. The method of claim 1 comprising biaxially texturing the metal substrate prior to electrodepositing the gold.
9. The method of claim 8 including rolling the metal substrate to biaxially texture the metal substrate.
10. The method of claim 8 including epitaxially depositing the gold layer on the biaxially textured substrate.
11. The method of claim 1 comprising repeating the electrodepositing step to increase the thickness of the gold layer.
12. A method of making a superconducting article comprising:

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electrodepositing a layer of gold having biaxial texturing onto a surface of a substrate; and

depositing a superconducting layer onto the gold layer such that biaxial texturing of the gold layer is maintained in the superconducting layer.

5 13. The method of claim 12 including depositing the superconducting material by pulsed-laser deposition.

14. The method of claim 12 further comprising annealing the gold layer in forming gas to increase biaxial texturing.

10 15. A method of depositing a gold layer having biaxial texturing onto a substrate comprising electrodepositing gold at a current density of between about 0.10 and 3.5 mA/cm² for between about 1 and 60 minutes.

16. A biaxially textured, superconducting article for use in electronic devices comprising:

a substrate; and

15 a gold layer having biaxial texturing deposited on the substrate.

17. The article of claim 16 wherein the substrate consists essentially of nickel, tungsten, chromium, titanium, palladium or copper.

18. The article of claim 16 wherein the substrate consists essentially of nickel.

19. The article of claim 16 wherein the substrate has biaxial texturing.

20 20. The article of claim 19 wherein the gold layer is epitaxially deposited onto the biaxially textured substrate.

21. The article of claim 16 wherein the gold layer has partial biaxial texturing.

22. The article of claim 16 wherein the gold layer has complete biaxial texturing.

23. The article of claim 16 wherein the gold layer has a thickness between about 0.01 and 5 microns.

25 24. A superconducting article comprising:

a metal substrate having a surface;

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a gold layer having biaxial texturing deposited on the surface of the metal substrate; and

a superconducting material having biaxial texturing deposited onto the gold layer.

5 25. The article of claim 24 wherein the biaxial texturing is maintained in the superconducting material.

26. The article of claim 24 wherein the superconducting material is a high temperature superconducting material.

10 27. The article of claim 24 wherein the superconducting material is YBCO, BSCCO, TBCCO, PBSCCO, TSBCCO, TPSBCO, HBCCO, or HBCO.

28. The article of claim 24 wherein the superconducting material includes YBCO.